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12 April 1966

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TO : [redacted]

SUBJECT : Efforts to Solve Pilot Comfort Problem

REFERENCE : Headquarters Message 7178, 29 March 1966.
Your letter of 31 March, Subject, Suit and
Helmet Session with [redacted] of David-
Clark, 23 March 1966.

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1. In order to assure mutual understanding of several parties involved and efficient coordination of effort to solve subject problem, the following is submitted:

2. Ref your 31 March 1966 letter:

Helmet Shell:

Phase I - David-Clark is proceeding to aluminize the helmet exterior in place of present white paint.

Phase II - Any additional effort to revise the helmet shell to be held in abeyance subject to evaluation of several other efforts.

Visor-Pressure Faceplate

1. Agree.

2. PPG visors presently have two anti-reflective coatings.

3. [redacted] has been in contact with Perkin-Elmer of feasibility of coating present pressure faceplates. Following is quoted from letter received from Joe. "Discussions have been held between we and the Perkin-Elmer Corporation on the feasibility of coating the present pressure face plates. They concede that applying anti-reflectance coatings to the inside surface of this visor with the existing thin

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plastic film which protects the gold conductive film would have to be on an exploratory basis with low level of confidence of success. An estimated cost for this exploratory work would be in the area of \$10,000. Some problems will exist due to the concern for processes which the present visor coater, Sierracin Corporation, now claims as proprietary to them." In view of this, it is considered prudent to preclude any expenditures at this time.

4. There are five PPG visors with two layers of anti-reflective coating on the inside and outside in the inventory. Per [redacted] Optical Coating Labs 25X1A expects to complete coating of three sets of blanks within the next few weeks. In addition, PPG hopes to deliver a visor with three layers of coating.

5. All the face plates at OCL are PPG.visors.

Sun Shield - Infra-Red Reflective

1. Agree.

2. Again per [redacted] "The Gemini helmet has been fitted with only one (1) auxiliary visor. This was for solar radiation protection. References to the multiple auxiliary shield must be corrected to read Apollo Block II Space Suit Assemblies. 25X1A

"The mountings developed for the Gemini and Apollo programs are not relative to this program because the helmet configurations are entirely different. The Apollo program uses a dome enclosure which does not provide for movable pressure face plates or inter-relating oxygen systems, etc.

"These comments should not be construed to mean that multiple auxiliary shields are not feasible. It does mean engineering work will be required specifically for the model helmets we use.

"The loan of a sample Apollo helmet is not possible, even quite irrelevant."

3. Four clear sunshades being procured from D. Clark ref message 7178. Before proceeding with coating of one of the present sunshades evaluation of the above four should be completed.

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4. The advisability of having more than one auxiliary sunshade is not considered favorably because of the weight and bulk involved plus the added complexity to the helmet. Another important consideration is the wide differences of opinion among project pilots. Some report using it on occasions while others report never using it. Capt. [redacted] is getting additional information.

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Other Considerations

Reference second paragraph page 5. The following comments are those of [redacted] "There appears to be a tendency, perhaps naturally at this point in the program, to place virtually all the emphasis on the relatively normal conditions being experienced in the cockpit environment. Only occasionally has there been some analysis of what the conditions might be expected to be with total failure of the environmental control system which would place the pilot in an environment on the mission profile representing lowest absolute altitude and hottest conditions for some period of time which has not yet been defined." 25X1A

"It is our considered opinion that the entire atmospheric pressure range from the normal to the emergency should be included in the thermal analysis. We will check the selected materials at the normal cabin altitude under comparative conditions so that there will be less likelihood for disagreement as indicated in this referenced paragraph."